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“पुराने को छोड़ नये के तरफ”

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IS 5175 (1992): Polypropylene ropes (3-strand hawser-laid and 8-strand-plaited) [TXD 9: Cordage]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS 5175 : 1992

भारतीय मानक

पॉलीप्रोपाइलीन रस्सी (3 लई वाली हॉसर तथा
8 लई वाली बटदार) — विशिष्ट
(दूसरा पुनरीक्षण)

Indian Standard

POLYPROPYLENE ROPES (3-STRAND
HAWSER-LAID AND 8-STRAND PLAITED) —
SPECIFICATION

(Second Revision)

UDC 677-072-688 : 677-494-742-3

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 1992

Price Group 2

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Cordage Sectional Committee had been approved by the Textile Division Council.

This Standard was first published in 1969 and subsequently revised in 1982. The standard has been again taken up for revision so as to align it with draft International Standard ISO/DIS 1346 Ropes — Polypropylene — Specification. Following major changes have been carried out in this revised version:

- a) Dimensional characteristic of this rope is only linear density. Nominal diameter in mm referred as reference number is only meant for use as designation of the rope;
- b) Values of maximum pitch or length of lay has been reduced;
- c) Values of minimum breaking load have been modified; and
- d) Tolerances on linear density have also been modified and related to reference number.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

POLYPROPYLENE ROPES (3-STRAND HAWSER-LAID AND 8-STRAND PLAITED) — SPECIFICATION (*Second Revision*)

1 SCOPE

This standard specifies requirements for 3-strand hawser-laid polypropylene ropes and 8-strand (plaited) polypropylene ropes

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 3871 : 1984 shall apply

4 ATMOSPHERIC CONDITIONS FOR CONDITIONING AND TESTS

Tests shall be carried out under prevailing atmospheric conditions. In all cases of dispute, however, the tests shall be carried out on samples which have been conditioned for 24 hours in a standard atmosphere at 65 ± 2 percent relative humidity and $27 \pm 2^\circ\text{C}$ temperature (see IS 6359 : 1971). When practicable, the tests shall be carried out in the standard atmosphere. Otherwise, tests shall be carried out as quickly as possible and not exceeding 15 minutes of removal of the test pieces from the conditioning atmosphere

5 MANUFACTURE

5.1 Yarn

The ropes shall be manufactured from polypropylene monofilament fibrillated film, serrated tape or multifilament yarn. The rope yarns shall not contain fibres which have been used or recovered

5.2 Construction

5.2.1 Unless otherwise specified, hawser-laid ropes shall be manufactured from hawser-laid yarns twisted together with a 'Z' twist, the strands themselves consisting of single yarns or 'Z' twisted yarns in 'S' twist

5.2.2 Unless otherwise specified, 8 strand plaited ropes shall be manufactured from four pairs of strand each alternate pair consisting of two 'S' twisted and two 'Z' twisted strands respectively

5.2.3 The number of rope yarns in all the strands shall be same

5.3 Structure

The ropes and their strands shall be continuous without splice

5.4 Treatment

The ropes shall be stabilized against deterioration due to sunlight. Any ultraviolet inhibition system may be used such as pigmentation using carbon black, iron oxide or any other colouring product or special ultraviolet inhibitor

5.5 Rope

The twisted rope shall be flexible, well laid and free from defects in yarn, strand and finish.

6 REQUIREMENTS

6.1 The 3-strand hawser laid rope shall conform to the requirements given in Table 1 and 8-strand plaited rope shall conform to the requirements given in Table 2

6.2 Mass of the Coil

The net mass of the coil containing 220 metres of rope including ties and lashing but not packing materials shall be as specified in Table 1 and Table 2 for 3-strand hawser-laid and 8-strand plaited ropes respectively

NOTE — In case coil contains rope length other than 220 metres net mass shall be calculated from multiplication of linear density with rope length

6.3 Length of Coil

The length of each coil when tested as per IS 7071 (Part 2) : 1989 shall not be less than

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AMENDMENT NO. 1 APRIL 1997
TO
IS 5175 : 1992 POLYPROPYLENE ROPES (3-STRAND
HAWSER-LAID AND 8-STRAND PLAITED) —
SPECIFICATION

(Second Revision)

(Second cover page, Foreword) — Substitute 'increased' for 'reduced' in item (b) of second para.

(Page 2, Table 1, col 4, heading):

- a) Substitute 'Linear Density' for 'Density'.
- b) Substitute '7.4' for '6' under column 'Linear Density' against '4 mm Nominal Diameter'.

(Page 3, Table 2) — Substitute '107 100' for '10 710' under column 'Breaking Strength' against 'Size No. 12'.

(TX 09)

AMENDMENT NO. 2 MARCH 2002
TO
IS 5175 : 1992 POLYPROPYLENE ROPES (3-STRAND
HAWSER-LAID AND 8-STRAND PLAITED) —
SPECIFICATION
(Second Revision)

(*Page 1, clause 5.2.3*) — Substitute the following for the existing :

‘**5.2.3** The number of yarns in all the strands of a rope shall be equal. However, a variation upto ± 5 percent shall be permissible.’

(TX 09)

Reprography Unit, BIS, New Delhi India

Indian Standard

POLYPROPYLENE ROPES (3-STRAND HAWSER-LAID AND 8-STRAND PLAITED) — SPECIFICATION (*Second Revision*)

1 SCOPE

This standard specifies requirements for 3-strand hawser-laid polypropylene ropes and 8-strand (plaited) polypropylene ropes.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

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Tests shall be carried out under prevailing atmospheric conditions. In all cases of dispute, however, the tests shall be carried out on samples which have been conditioned for 24 hours in a standard atmosphere at 65 ± 2 percent relative humidity and $27 \pm 2^\circ\text{C}$ temperature (see IS 6359 : 1971). When practicable, the tests shall be carried out in the standard atmosphere. Otherwise, tests shall be carried out as quickly as possible and not exceeding 15 minutes of removal of the test pieces from the conditioning atmosphere.

5 MANUFACTURE

5.1 Yarn

The ropes shall be manufactured from polypropylene monofilament fibrillated film, serrated tape or multifilament yarn. The rope yarns shall not contain fibres which have been used or recovered.

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5.2.1 Unless otherwise specified, hawser-laid ropes shall be manufactured from hawser-laid yarns twisted together with a 'Z' twist, the strands themselves consisting of single yarns or 'Z' twisted yarns in 'S' twist

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5.2.3 The number of rope yarns in all the strands shall be same.

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The ropes and their strands shall be continuous without splice.

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The ropes shall be stabilized against deterioration due to sunlight. Any ultraviolet inhibition system may be used such as pigmentation using carbon black, iron oxide or any other colouring product or special ultraviolet inhibitor.

5.5 Rope

The twisted rope shall be flexible, well laid and free from defects in yarn, strand and finish.

6 REQUIREMENTS

6.1 The 3-strand hawser-laid rope shall conform to the requirements given in Table 1 and 8-strand plaited rope shall conform to the requirements given in Table 2.

6.2 Mass of the Coil

The net mass of the coil containing 220 metres of rope including ties and lashing but not packing materials shall be as specified in Table 1 and Table 2 for 3-strand hawser-laid and 8-strand plaited ropes respectively.

NOTE — In case coil contains rope length other than 220 metres, net mass shall be calculated from multiplication of linear density with rope length

6.3 Length of Coil

The length of each coil when tested as per IS 7071 (Part 2) : 1989 shall not be less than

IS 5175 : 1992

220 m or as declared. However, if so agreed between the buyer and the seller, the length of coil may be tested under zero tension and the following tolerances shall be applicable on the specified/declared length

Reference Number	Tolerance
Up to 14	± 5 percent
Above 14	± 3 percent

NOTE — Any coil which has been shortened by cutting from it, the necessary test sample shall be accepted at its original length and mass as part of the delivery provided that the test sample complies with the specified requirements

7 PACKING

The ropes shall be neatly coiled and suitably packed to prevent damage during transit

NOTE — IS 3258 : 1980 may be followed for packing ropes intended for use within the country

Table 1 Requirements for Polypropylene Fibrillated Film, Monofilament and Serrated Tape Ropes, 3-Strand, Hawser-Laid

(Clauses 6.1 and 6.2)

Nominal Diameter (Reference Number)	Mass per Coil (220 m Length)	Pitch (or Length of Lay), (Max) mm	Density kg/m ³	Linear Breaking Strength (Min) kgf
mm	kg			
4	1.63	14.8	6	214
6	3.67	22.2	17	602
8	6.60	29.6	30	1 060
10	10.00	37.0	45	1 560
12	14.50	44.4	65	2 210
14	20.00	51.8	90	3 050
16	25.50	59.2	115	3 770
18	32.50	66.6	148	4 810
20	40.00	74.0	180	5 800
22	48.50	81.4	220	6 960
24	57.00	88.8	260	8 130
26	67.60	96.2	305	9 410
28	78.00	103.6	355	10 700
30	89.00	111.0	405	12 220
32	101.00	118.4	460	13 500
36	129.00	133.2	585	16 930
40	158.00	148.0	720	20 510
44	194.00	162.8	880	24 640
48	229.00	177.6	1 040	28 610
52	268.00	192.4	1 220	33 110
56	312.00	207.2	1 420	37 850
60	359.00	222.0	1 630	43 280
64	407.00	236.8	1 850	48 980
72	515.00	266.4	2 340	61 500
80	638.00	296.0	2 900	75 640
88	772.00	325.6	3 510	90 760
96	916.00	355.2	4 170	107 140
Tolerance				
4 to 8 mm	± 10 percent		± 10 percent	
10 to 14 mm	± 8 percent	—	± 8 percent	—
16 mm and above	± 5 percent		± 5 percent	
Method of Test	IS 7071 (Part 2) 1989	IS 7071 (Part 3) 1989	IS 7071 (Part 2) 1989	IS 7071 (Part 4) 1986

NOTE — 1 kgf = 9.8 N approximately

Table 2 Requirements for Polypropylene Fibrillated Film, Monofilament or Multifilament Ropes, 8-Strand, Plaited(*Clauses 6.1 and 6.2*)

Size No.	Nominal Diameter (Reference Number) mm	Mass per Coil (220 m Length) kg	Pitch (or Length of Lay), (Max) mm	Linear Density ktex	Breaking Strength (Min) kgf
1	8	6.6	32	30	1 060
1.5	12	14.3	48	65	2 210
2	16	25.3	64	115	3 770
2.5	20	40	80	180	5 800
3	24	57	96	260	8 130
3.5	28	78	112	355	10 700
4	32	101	128	460	13 500
4.5	36	129	144	585	16 930
5	40	158	160	720	20 510
5.5	44	198	176	880	24 640
6	48	229	192	1 040	28 610
6.5	52	268	208	1 220	33 110
7	56	312	224	1 420	37 850
7.5	60	359	240	1 630	43 280
8	64	407	256	1 850	48 980
9	72	515	288	2 340	61 500
10	80	638	320	2 900	75 640
11	88	772	352	3 510	90 760
12	96	916	384	4 170	10 710
13	104	1 078	416	4 900	122 900
14	112	1 254	448	5 700	141 830
15	120	1 430	480	6 500	162 860
16	128	1 628	512	7 400	181 860
17	136	1 848	544	8 400	207 000
18	144	2 068	576	9 400	231 000
20	160	2 534	640	11 521	283 060
Tolerance					
up to 8 mm		± 10 percent	—	± 10 percent	—
up to 12 mm		± 8 percent		± 8 percent	
16 mm and above		± 5 percent		± 5 percent	
Method of Test	IS 7071 (Part 2) : 1989	IS 7071 (Part 3) : 1989	IS 7071 (Part 2) : 1989	IS 7071 (Part 4) : 1986	

NOTES

1 Nominal diameter is given for reference only.

2 1 kgf = 9.8 N approximately.

8 MARKING

8.1 Each coil shall have securely attached labels at both ends carrying the following information:

- a) Name of the material;
- b) Reference number (Diameter, mm);
- c) Length (m) of the rope;

d) Indication of the source of manufacture; and

e) Any other information required by the buyer.

8.1.1 The coil may also be marked with the Standard Mark.

9 SAMPLING

9.1 Lot

A quantity of coils of rope of the same linear density, dimensions, and type, manufactured under similar conditions and delivered to a buyer against a despatch note shall constitute a lot.

9.2 Sample Size

Sampling shall be as representative as possible of the lot subjected to the measurements and tests. Draw the samples at random, at the rate shown by the following formula:

$$S = 0.4 \sqrt{N}$$

Where S is the number of sample lengths of rope and N is the size of the lot expressed as the number of coils. When S as calculated is not a whole number, round off the value

obtained to give the whole number in accordance with the requirements of IS 2 : 1960. In cases where S is less than 1, draw one sample length.

9.3 Criteria of Conformity

The lot should be declared conforming to the standard if the following conditions are satisfied:

- a) Length of each coil satisfies the specified/declared length;
- b) All the individual test samples tested for breaking strength satisfy the specified breaking strength. However, in case of failure of a test specimen drawn from a coil another specimen shall be retested from the same coil and the same shall satisfy the specified requirement; and
- c) Average values of the test results of the lot in respect of other characteristics conform to the specified requirements.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
3256 : 1980	Code for inland packaging of ropes and cordages (<i>first revision</i>)	7071 (Parts 1 to 3) : 1989	Ropes and Cordages — Methods of physical test (<i>first revision</i>)
3871 : 1984	Glossary of terms relating to fibre ropes and cordage (<i>first revision</i>)	7071 (Part 4) : 1986	Methods of physical test for ropes and cordages — Breaking load and elongation at break.
6359 : 1971	Method for conditioning of textiles		

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

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Indian Standards are reviewed periodically and revised, when necessary and amendments, if any, are issued from time to time. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition. Comments on this Indian Standard may be sent to BIS giving the following reference:

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices :

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002

Telephone

{ 331 01 31
{ 331 13 75

Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola
CALCUTTA 700054

{ 37 84 99, 37 85 61,
{ 37 86 26, 37 86 62

Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036

{ 53 38 43, 53 16 40,
{ 53 23 84

Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113

{ 235 02 16, 235 04 42,
{ 235 15 19, 235 23 15

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
BOMBAY 400093

{ 632 92 95, 632 78 58,
{ 632 78 91, 632 78 92

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE.
FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR.
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